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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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HEWLETT-PACKARD COMPANY  
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EXAMINER

SHERALI, ISHRAT I

ART UNIT PAPER NUMBER

2621

DATE MAILED: 11/01/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/803,469

Applicant(s)

SOBOL ET AL.

Examiner

Sherali Ishrat

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on 14 June 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-41 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-41 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 14 June 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **Response to Arguments**

1. This action is in response to arguments received on 6/14/2004.

Applicant's arguments are fully considered however they are not persuasive with respect to art rejection. See the remarks section for detail discussion.

Regarding claims 24-41, based on the persuasive arguments, rejection of claims 24-41 under 35 U.S.C § 112 first paragraph is withdrawn.

Regarding claims 9-13, 18-22, 28-32 and 37-41, arguments with respect to rejection under 35 U.S.C §112 first paragraph is not persuasive. See the remarks section for detail discussion.

## **Claim Rejections - 35 USC § 112**

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 9-13, 18-22, 28-32 and 37-41 are rejected under 35 U.S.C § 112 first paragraph, as failing to comply with enablement requirement.

Regarding claims 9, 18, 28 and 37, they recite "multiple tables are used to modify, the small contrast difference and modify the maximum contrast differences in the original image as function of the distances between different areas". Specification discusses in the form of abstract multiple tables on page 9, lines 8-10 and page10, lines 10-12 and in figure 7 shows single tone map. However the specification does not

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show the multiple tables and does not give detail how these tables are derived or constructed. Claims 10-13, 19-22, 29-32 and 38-41 are dependent on claims 9, 18, 28 and 37. Therefore they are also rejected.

### **Claim Rejections - 35 USC § 102**

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-2 are rejected under 35 USC § 102 (b) as being anticipated by Rahman et al. (Multi-scale retinex for color image enhancement, IEEE 0-7803-3258).

Regarding claim 1, Rahman changing the dynamic range of an original image to match closely match the dynamic range of the medium used for a reproduction (Rahman, in page 1004, paragraph 2, left-column, lines 20-24, states “The MSR combines the dynamic range compression of the small scale retinex with tonal rendition of the large scale retinnex to produce an output” This corresponds to changing the dynamic range of an original image to match closely the dynamic range of the medium used for a reproduction); comprising

modifying the contrast difference between different areas of the original image (Rahman, in page 1004, paragraph 2, left-column, lines 33-37, states “graying of areas of constant intensity occurs because the retinex enhances each color band as

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function of its surrounds” , In the system of Rahman graying of constant intensity as function of its surround corresponds to modifying the contrast difference between different areas of the original image),

as a function of the distance between the different areas (Rahman, in page 1004, paragraph 2, left-column, lines 33-37, states “graying of areas of constant intensity occurs because the retinex process enhances each color band as function of its surround. The smaller values in the weaker channel get pushed up strongly”. In the system of Rahman graying of areas of constant intensity based on function of its surround [smaller distance] corresponds to modifying the contrast difference between different areas of the original image as a function of the distance between the different areas because Rahman is graying area of constant intensity as function of its surrounding area which corresponds to closer distance).

Regarding claim 2, Rahman discloses the contrast differences are preserved for large distances between the different areas (Rahman, in page 1004, paragraph 2, lines 33-37, states “graying of areas of constant intensity occurs because the retinex process enhances each color band as function of its surround [neighboring area]” Rahman shows enhancing contrast of each color as a function of its surround i.e Rahman is enhancing contrast of surrounding/neighboring [small distance] pixels/area, because Rahman shows enhancing contrast of surrounding/neighboring areas/pixels therefore Rahman is preserving the contrast differences for large distances between the different areas) and ,

the contrast differences are enhanced for small distances between the different areas (Rahman, in page 1004, paragraph 2, lines 33-37, "graying of areas of constant intensity occurs because the retinex process enhances each color band as function of its surround" Rahman shows enhancing contrast of each color as a function of its surround i.e Rahman is enhancing contrast of surrounding/neighborhood [small distance] pixels/area).

### **Claim Rejections - 35 USC § 103**

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 3-9, 14-18, 23-28, 33-37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rahman et al. (Multi-scale retinex for color image enhancement, IEEE 0-7803-3258) in view of Frankel et al. (US 4,384,336).

Regarding claim 3-4, 7-8, 16-17, 26-27 and 35-36 Rahman does not explicitly disclose contrast difference are reduced for small distance between areas and very small contrast difference are substantially eliminated only for small distance between the different areas.

In the same field of endeavor Frankel disclose contrast differences are reduced for small distances between different areas (Frankel in figure 1 shows comparing radiance [contrast difference] between neighboring areas and Frankel in, col. 21, lines

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16-23, states "illustrated threshold function is such that all input values between (-2) and (+2) units inclusive produces the same out put value, such a threshold yield a ratio of unity when the two radiance values [contrast difference] being compared are within a specified percent of each other. This threshold removes the spatially slow changing effects of illumination", Frankel is reducing contrast differences for small distance [neighboring areas ] by removing spatially slow changing effects [small contrast differences for small distances/neighboring area]).

very small contrast difference are substantially eliminated only for small distance between the different areas (Frankel in figure 1 shows comparing radiance [contrast difference] between neighboring areas [small distance] and Frankel, in col. 21, lines 16-23, "illustrated threshold function is such that all input values between (-2) and (+2) units inclusive produces the same out put value, such a threshold yield a ratio of unity when the two radiance values [contrast difference] being compared are within a specified percent of each other" i.e Frankel is eliminating very small contrast difference for small distances).

Therefore it would have been obvious to one having ordinary skill in the art at time the invention was made to reduce/eliminate contrast differences for small distance as shown by Frankel in the system of Rahman because such a process provide elimination or reduction of false contrast differences between neighboring pixels/areas due to illumination.

Regarding claim 5, 14, 23, Rahman discloses changing the dynamic range of an original image to match closely match the dynamic range of the medium used for a

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reproduction (Rahman, in page 1004, paragraph 2, left-column, lines 20-24, states "The MSR combines the dynamic range compression of the small scale retinex with tonal rendition of the large scale retinex to produce an output" This corresponds to changing the dynamic range of an original image to match closely the dynamic range of the medium used for a reproduction); comprising

modifying the contrast difference between different areas of the original image (Rahman, in page 1004, paragraph 2, left-column, lines 33-37, states "graying of areas of constant intensity occurs because the retinex enhances each color band as function of its surrounds" , In the system of Rahman graying of constant intensity as function of its surround corresponds to modifying the contrast difference between different areas of the original image),

as a function of the distance between the different areas (Rahman, in page 1004, paragraph 2, left-column, lines 33-37, states "graying of areas of constant intensity occurs because the retinex process enhances each color band as function of its surround. The smaller values in the weaker channel get pushed up strongly". In the system of Rahman graying of areas of constant intensity based on function of its surround [smaller distance] corresponds to modifying the contrast difference between different areas of the original image as a function of the distance between the different areas because Rahman is graying area of constant intensity as function of its surrounding area).

Rahman has not explicitly disclose limiting the maximum contrast differences between different area of the original input image.



In the same field of endeavor Frankel discloses limiting the maximum contrast differences between different area of the original input image (Frankel in figure 1 shows comparing radiance [contrast difference] between neighboring areas and Frankel, col. 10, lines 54-56, "A preferred practice is to reset each resultant ratio of radiance of paired of pixels which exceeds the maximum value" , the ratio of radiance of paired pixel with maximum contrast difference will have a value exceeding maximum value which is resetted in the system of Frankel. This corresponds to limiting the maximum contrast differences between different area of the original input image).

Therefore it would have been obvious to one having ordinary skill in the art at the time invention was made to limit the maximum contrast differences between different area [neighboring areas] as shown by Frankel in the system of Rahman because such a process provide a system for mapping of dynamic range from one image display device to other display device with limited dynamic range.

Regarding claim 6, 15, 25, and 34 Rahman discloses the contrast differences are preserved for large distances between the different areas (Rahman, in page 1004, paragraph 2, lines 33-37, states "graying of areas of constant intensity occurs because the retinex process enhances each color band as function of its surround [neighboring area]" Rahman shows enhancing contrast of each color as a function of its surround i.e Rahman is enhancing contrast of surrounding/neighboring [small distance] pixels/area, because Rahman shows enhancing contrast of only surrounding/neighboring areas/pixels therefore Rahman is preserving the contrast differences for large distances between the different areas) and ,

the contrast differences are enhanced for small distances between the different areas (Rahman, in page 1004, paragraph 2, lines 33-37, "graying of areas of constant intensity occurs because the retinex process enhances each color band as function of its surround" Rahman shows enhancing contrast of each color as a function of its surround i.e Rahman is enhancing contrast of surrounding/neighbor [small distance] pixels/area).

Regarding claim 9, 18, 28, and 37, Frankel discloses multiple look up tables to modify the small contrast differences and modify the maximum contrast differences as a function of distance between different area (Frankel figures 4-5 shows multiple look-up to modify the contrast differences based on the distances, modifying small contrast differences [Frankel in, col. 21, lines 16-23, states "illustrated threshold function is such that all input values between (-2) and (+2) units inclusive produces the same out put value, such a threshold yield a ratio of unity when the two radiance values {contrast difference} being compared are within a specified percent of each other. This threshold removes the spatially slow changing effects of illumination", Frankel is reducing contrast differences for small distance [neighboring areas ] by removing spatially slow changing effects {small contrast differences for small distances/neighbor area} and modify the maximum contrast differences [Frankel, col. 10, lines 54-56, "A preferred practice is to reset each resultant ratio of radiance of paired of pixels which exceeds the maximum value", the ratio of radiance of paired pixel with maximum contrast difference will have a value exceeding maximum value which is resetted in the system of Frankel).

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Regarding claims 24 and 33, Rahman discloses modifying the contrast difference of the ratio function (See Rahman, page 1004, paragraph 2, lines 33-37, Rahman show "graying of areas of constant intensity", In the system of Rahman graying of constant intensity modifying the contrast difference between different areas of the original image, Rahman is modifying areas of constant intensity [extremely low contrast] by graying [inducing difference in intensities] different areas of image and Rahman in page 1003, paragraph 2, lines 1-3, Rahman shows ratios in the form log subtraction which is same ratio of different area),

as a function of the distance between the different areas (See Rahman, page 1004, paragraph 2, lines 33-37, Rahman shows "graying of areas of constant intensity occurs because the retinex process enhances each color band as function of its surround" Rahman shows enhancing contrast of each color as a function of its surround i.e Rahman is enhancing contrast of surrounding/neighboring [small distance] pixels/area).

Rahman has not explicitly disclose limiting the maximum contrast differences of ratio function.

In the same field of endeavor Frankel discloses limiting the maximum contrast differences between different area of the original input image (See Frankel, col. 10, lines 54-56, "to reset each resultant ratio of radiance of paired of pixels which exceeds the maximum value" and in Figures 1A-1D Frankel shows the ratio of neighboring pixels are compared, the ratio of radiance of paired pixel with maximum contrast difference will have a value exceeding maximum value which is resetted in the system

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of Frankel therefore Frankel shows limiting the maximum contrast and Frankel in figures 1A-1D comparing neighboring pixels which have small distance i.e Frankel is limiting the maximum contrast of pixels of small distances);

Therefore it would have been obvious to one having ordinary skill in the art at the time invention was made to limit the maximum contrast differences between different area [neighboring] of the original input image as shown by Frankel because such a process provide a system for mapping of dynamic range from one image display device to other display device with limited dynamic range.

### **Allowable Subject**

7. Claims 10-13, 19-22, 229-32 and 38-41 are objected as being dependent on rejected base claim but would be allowable if rewritten in independent form including limitation of the base claim and any intervening claims. Also provided that claims overcome the rejection under 35 U.S.C § 112 first paragraph.

### **Remarks**

8. In the arguments received on 6/14/2004. Applicant argue the following:

a. The independent claims, 1, 5, 14, 23-24 and 33 all contain the limitation that contrast differences are modified as a function of the distance between different areas. Rahman does not disclose contrast differences are modified as a function of the distance between different areas. Retinex process does operate as a function of immediate surrounding.

Examiner strongly disagree with Applicant's interpretation of Rahman's reference. Rahman, in page 1004, paragraph 2, left-column, lines 33-37, states "graying of areas of constant intensity occurs because the retinex process enhances each color band as function of its surround. The smaller values in the weaker channel get pushed up strongly". In the system of Rahman graying of areas of constant intensity based on function of its surround [smaller distance] corresponds to modifying the contrast difference between different areas of the original image as a function of the distance between the different areas because Rahman is graying area of constant intensity as function of its surrounding area. Surround in the system of Rahman corresponds to neighboring areas/surrounding areas, which includes immediate surrounding areas.

b. The look-up tables corresponds to a tone map as plotted in figure 7. Tone maps are look up tables. Therefore it is obvious that specification shows multiple look-up tables.

Examiner agrees with Applicant that figure 7, shows tone map, which corresponds to a look-up table for modifying contrast differences. However Applicant has not shown multiple tone maps, corresponding to multiple look-up table. Neither Applicant has shown division of tone map of figure 7 and nor Applicant has shown any motivation or advantage of dividing of tone map of figure 7 to construct multiple look-up tables.

## **Conclusion**

9. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

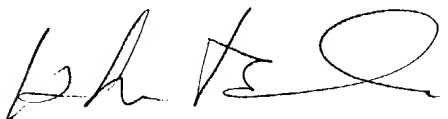
## **Communication**

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sherali Ishrat whose telephone number is 703-308-9589. The examiner can normally be reached on 8:00 AM - 4:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Leo Boudreau can be reached on 703-305-4706. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

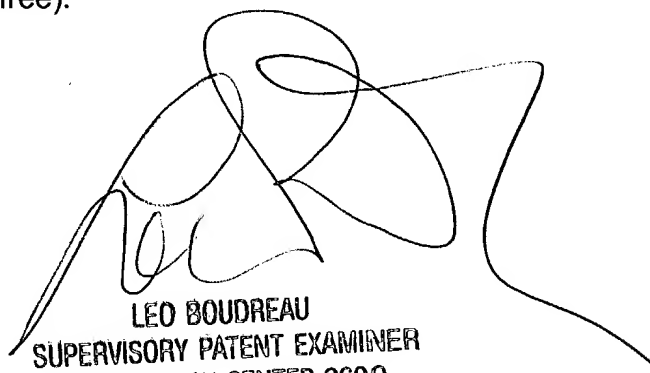


Ishrat Sherali

Patent Examiner

Art Unit 2621

October 19, 2004



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